

REMARKS

Claims 13-29 are currently pending in the application. Claims 13 and 19 have been amended, claims 1-12 are canceled, and claims 26-29 are withdrawn from consideration with this response. Reconsideration of the application in light of the following remarks is respectfully requested.

I. RESTRICTION REQUIREMENT

The application was subjected to a restriction requirement. Applicant hereby affirms the election of Species II, associated with claims 13-25, and submits that claim 13 is generic to Species II, III and IV. Claims 1-12 have been canceled, and claims 26-29 are withdrawn from consideration.

II. REJECTION OF CLAIM 19 UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claim 19 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 19 has been amended to remove the term "type." Accordingly, claim 19 is believed to be definite, and withdrawal of the rejection is therefore respectfully requested.

III. REJECTION OF CLAIMS 13-18 AND 20-22 UNDER 35 U.S.C. § 103(a)

Claims 13-18 and 20-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,888,146 (Leung) in view of U.S. Patent Publication No. 2001/0047760 (Moslehi). Withdrawal of the rejection is respectfully requested for at least the following reasons.

- i. Neither Leung nor Moslehi teach or suggest a series arrangement of conductor segments and capacitors residing within the chamber, as recited in claim 13.*

Claim 13 is directed to an ion shower system comprising a plasma source and an extraction assembly. The plasma source is operable to generate ions within a

chamber, and comprises a plurality of conductor segments and a plurality of capacitors serially connected through the conductor segments, wherein the series arrangement of conductor segments and capacitors **reside within the source chamber**. Neither cited reference, alone or in combination, teach this feature.

As conceded in the Office Action, Leung does not teach a series arrangement of conductor segments and capacitors. (See, e.g., O.A., 12/14/05, p. 4, last paragraph). While Moslehi does disclose a series arrangement of conductor segments and capacitors in Figs. 2 and 22, in both instances, **the capacitors reside external to the chamber**. For example, as described in paragraph 57 in conjunction with Fig. 2 of Moslehi, it states that the “RF contacts 224 and 227 are externally connected together via an RF capacitor. Similarly, the RF contacts 228 and 232 are linked together via another external RF capacitor. These **external** capacitor connections (**on atmospheric side of the ICP source**) create a 3-turn inner zone coil with two series capacitors for reduced induced voltage.” (Emphasis added) (Paragraph 57, lines 15-21). Similarly, in paragraph 113 in conjunction with Fig. 22, Moslehi states: “[m]oreover, **external** inter-segment series capacitors C1 (611), C2 (612), and C3 (613) connect the antenna segments in series within each zone.” (Emphasis added) (Paragraph 113, lines 6-9). Therefore the combination of cited references do not teach or suggest the invention as recited in claim 13; and thus claim 13 and its associated depending claims are non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

- ii. **Moslehi does not appear to teach an inductive reactance of a conductor segment and a capacitive reactance of a capacitor (forming an antenna segment) being equal at the predetermined frequency, as recited in claim 16.**

Claim 16 depends upon claim 13, and further recites that an inductive reactance of a conductor segment and a capacitive reactance of a capacitor (that together form an antenna segment) are equal at the predetermined frequency of the antenna drive

circuit. In the above manner a resonant circuit exists, wherein the voltage drop across the inductive element (the conductor segment) is equal and opposite to the voltage drop across the capacitor. This feature may be employed advantageously to reduce a magnitude of the voltage drop across multiple antenna segments. (See, e.g., discussion in applicants' specification on page 21, line 21 – page 22, line 3). The Office Action asserts that Moslehi teaches this feature in paragraph 113, lines 13-17, however, such discussion does not state that such component reactances are equal as claimed. Rather, paragraph 113 of Moslehi indicates that an external RF matching network is provided to help improve load matching. Clearly if the component reactance values were equal as claimed, the matching network would not be necessary. Therefore Moslehi does not teach this feature, thereby rendering claim 16 non-obvious for at least this additional reason. Accordingly, withdrawal of the rejection is respectfully requested.

iii. Moslehi does not teach an azimuthally symmetric arrangement of the conductor segments and capacitors, as recited in claim 20.

Claim 20 depends upon claim 13, and further recites that the series arrangement of conductor segments and capacitors are arranged **within** the chamber in an azimuthally symmetric fashion. Initially, as highlighted above, Moslehi does not teach the capacitors arranged within the chamber as recited in the claimed invention. In addition, claim 20 states that the conductors and capacitors are arranged together in an azimuthally symmetric fashion. While conductor segments 186, 190 and 194 in Fig. 2 of Moslehi are arranged azimuthally, **the capacitors that couple such segments together are not arranged in the azimuthally symmetric fashion as claimed.** Rather, such capacitors follow the direction of the jumper water channels 214, 218, 226 and 230 illustrated in Fig. 2. As can be clearly seen in the figure, **the series arrangement is not arranged in the azimuthally symmetric fashion as recited in claim 20**, and therefore claim 20 is further non-obvious over the cited art. Accordingly, for at least this additional reason, withdrawal of the rejection is respectfully requested.

- iv. ***Leung does not disclose an extraction assembly associated with a top portion of the chamber, and operable to extract ion vertically, as recited in claim 21.***

Claim 21 depends upon claim 13, and further recites that the extraction assembly is associated with a ***top portion of the chamber***, and is ***operable to extract ions vertically*** from the top portion thereof. The cited art does not teach this feature. The Office Action asserts that Leung teaches this feature, citing item 14 in Fig. 3, and further citing Col. 3, lines 43-44 of the reference. However, Leung does not teach an extraction assembly associated with a top portion of the chamber that is operable to extract ions vertically from the top portion of the chamber as claimed. In Fig. 3 of the reference, an ion source has an extraction assembly 14 that is located on a ***side portion of the ion source chamber***, and as described and illustrated, ions that form an ion beam 20 are extracted from the side portion of the source chamber. Alternatively, Fig. 9 of the cited reference illustrates an ion source chamber 12, wherein the extraction appears to occur ***at a bottom portion thereof***.

In stark contrast to the teaching of Leung, the present invention extracts ions vertically from a top portion of the source chamber. Such an orientation is not arbitrary; rather, as highlighted in applicants' specification, the inventors of the present invention appreciated that the claimed extraction assembly orientation advantageously reduces contamination at the workpiece. More particularly, if any contaminants exist, they become suspended in the plasma during operation, and such contaminants fall to the bottom of the chamber upon deactivation of the plasma due to the influence of gravity. (See, e.g., page 9, line 21 – page 10, line 10 of applicants' specification). Consequently, upon deactivation, any contaminants fall away from the workpiece as opposed to falling toward the workpiece due to gravity (as in Fig. 9 of Leung) or toward the workpiece due to momentum provided thereto due to collisions with extracted ions (as in Fig. 3 of Leung). Clearly then, the cited art does not teach this feature, and the

present invention is non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested for at least this additional reason.

Further, claim 22 further recites a workpiece support structure operable to secure the workpiece having an implantation surface orientated **facing downward** toward the extraction assembly. Neither cited reference teach or suggest such a workpiece support structure. Accordingly, claim 22 is further non-obvious over the cited art for at least this additional reason.

IV. REJECTION OF CLAIMS 13 AND 23-25 UNDER 35 U.S.C. § 103(a)

Claims 13 and 23-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,068,784 (Collins) in view of Moslehi. Withdrawal of the rejection is requested for at the least the following reasons.

- i. Neither Collins nor Moslehi provides a series arrangement of conductor segments and capacitors within the source chamber, as recited in claim 13.***

As stated above, Moslehi does not teach a series arrangement of conductor segments and capacitors within the source chamber, as recited in claim 13. Collins, while not disclosing a series arrangement in any form whatsoever, does teach an RF antenna for a source chamber that is located external to the chamber. (See, e.g., Col. 8, lines 44-47). Therefore Collins does not remedy the deficiencies in Moslehi. Accordingly, the combination of cited art fail to teach the invention of claim 13, and thus claim 13 and its associated depending claims are non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

V. REJECTION OF CLAIM 19 UNDER 35 U.S.C. § 103(a)

Claim 19 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Leung in view of Moslehi, and further in view of U.S. Patent 6,552,295 (Markunas). Withdrawal of the rejection is requested for at the least the following reasons.

As stated above, neither Leung nor Moslehi teach or suggest a series arrangement of conductor segments and capacitors within a source chamber, as recited in claim 13. Claim 19 depends upon claim 13, and thus also recites this feature. Markunas does not remedy the deficiencies of the primary references, and therefore claim 19 is also non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

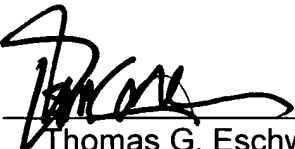
VI. CONCLUSION

For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 50-1733, EATNP146US.

Respectfully submitted,
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CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: April 14, 2006


Christine Gillroy